DRAFT

15362

Anorthosite

4.2 grams

Figure 1: Photo of 15362. NASA S71-49627. Sample is about 2.5 cm long and 1 cm in cross section.

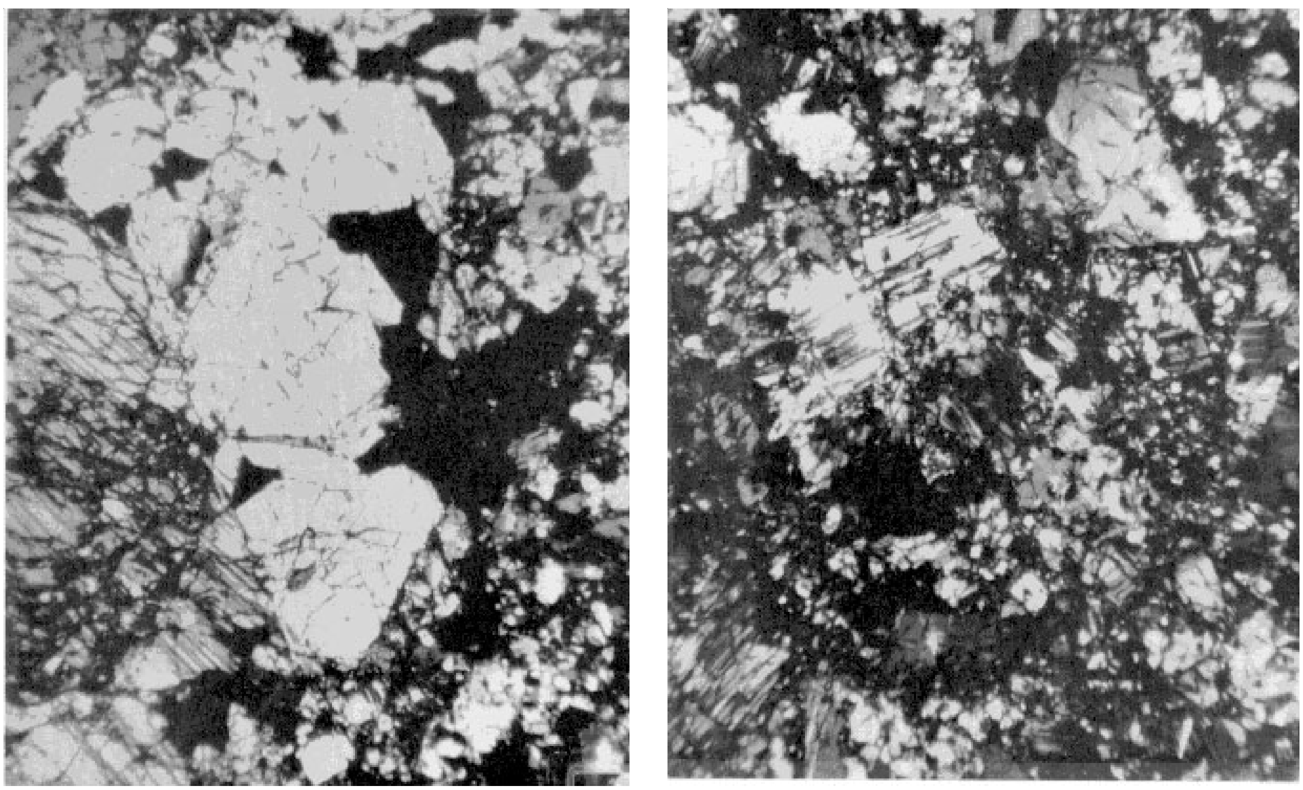

Figure 2: Two different views of thin section 15362,11 with crossed polarizers (from Ryder 1985). Width of field 2 mm.

Introduction

Sample 15362 is from a rake sample from Spur crater on the Hadley-Apennine Front. It is a cataclastic ferroan anorthosite that proved difficult to date. It has an old exposure age (428 m.y.).

Petrography

Dowty et al. (1972, 1973) studied the petrography of 15362 finding that it was 98 % plagioclase ($An_{96.5}$), 2 % orthopyroxene (Wo_2En_{59}) and trace augite, ilmenite, chromite and troilite. The plagioclase has been badly

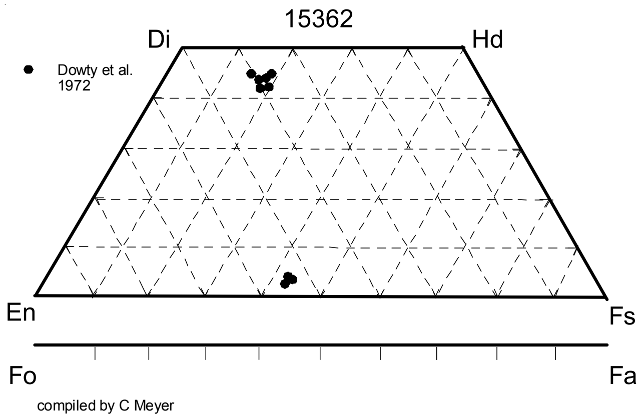

Figure 3: Composition of pyroxene in 15362 from Dowty et al. 1972).

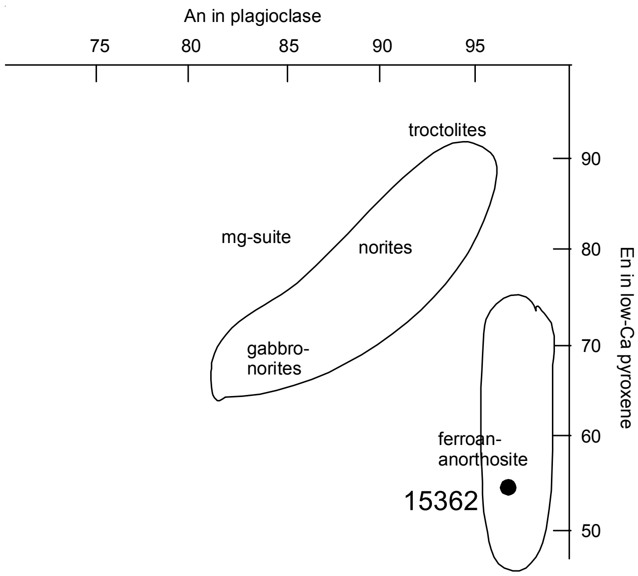

Figure 4: Composition of plagioclase and pyroxene in 15362 (from Dowty et al. 1972).

crushed and annealed (figure 2). The wide spread in composition of pyroxene indicates that the parent rock was held at subsolidus temperature for a long time.

Mineralogy

Olivine: none

Pyroxene: Dowty et al. (1972) and Bersch et al. (1991) determined the composition of pyroxene in 15362. Orthopyroxene is $Wo_2En_{59}Fs_{39}$ and augite is $Wo_{40}En_{40}Fs_{20}$ (figure 3).

Plagioclase: Dowty et al. (1972) analyzed plagioclase ($An_{96.5}$).

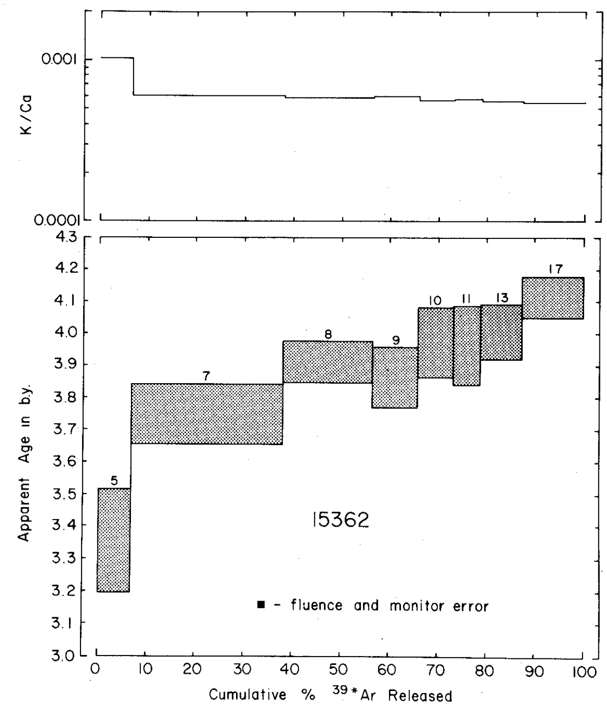

Figure 5: Ar/Ar plateau for 15362 as determined by Alexandra and Kahl (1974).

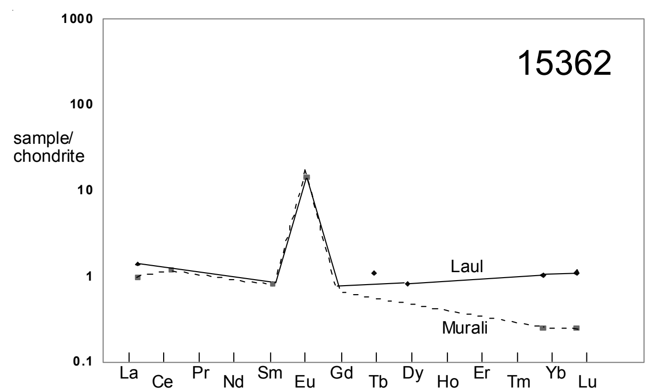

Figure 6: Normalized rare-earth-element composition of 15362 (data from Laul and Schmitt 1973 and Murali et al. 1977).

Ilmenite: An analysis of ilmenite in 15362 is given in Dowty et al. (1972).

Chromite: Dowty et al. (1972) reported two minute grains of chromite and gave an analysis.

Chemistry

The chemical composition of 15362 was reported by Laul and Schmitt (1973), Murali et al. (1977) and Dowty et al. (1972). The sample has a tall Eu anomaly (figure 6).

Table 1. Chemical composition of 15362.

reference	Murali 78		Laul 73		Dowty 72	
weight	,7					
SiO2 %					44	(b)
TiO2			0.2	(a)	0.03	(b)
Al2O3	32.3	(a)	35.4	(a)	35.1	(b)
FeO	0.23	(a)	0.57	(a)	0.29	(b)
MnO	0.005	(a)	0.014	(a)	0.01	(b)
MgO	0.3	(a)			0.31	(b)
CaO	17	(a)	18.4	(a)	19.8	(b)
Na2O	0.39	(a)	0.347	(a)	0.35	(b)
K2O	0.011	(a)	<0.02	(a)	0.04	(b)
P2O5						
S %						
sum						
Sc ppm	0.7	(a)	1.6	(a)		
V			<28	(a)		
Cr	27	(a)	80	(a)		
Co	0.31	(a)	1.4	(a)		
Ni	10	(a)				
Cu						
Zn						
Ga						
Ge ppb						
As						
Se						
Rb						
Sr						
Y						
Zr			<70	(a)		
Nb						
Mo						
Ru						
Rh						
Pd ppb						
Ag ppb						
Cd ppb						
In ppb						
Sn ppb						
Sb ppb						
Te ppb						
Cs ppm						
Ba						
La	0.23	(a)	0.33	(a)		
Ce	0.72	(a)				
Pr						
Nd						
Sm	0.12	(a)	0.12	(a)		
Eu	0.8	(a)	0.8	(a)		
Gd						
Tb			<0.04	(a)		
Dy			0.2	(a)		
Ho						
Er						
Tm						
Yb	0.04	(a)	<0.17	(a)		
Lu	0.006	(a)	0.027	(a)		
Hf	0.05	(a)				
Ta						
W ppb						
Re ppb						
Os ppb						
Ir ppb						
Pt ppb						
Au ppb						
Th ppm						
U ppm						

technique: (a) INAA, (b) broad beam elec. Probe

Radiogenic age dating

Alexander and Kahl (1974) set a lower limit for the age of 15362 (3.98 b.y.) by Ar/Ar, but the sample did not yield a good plateau (figure 5). The simplest explanation of the Ar release pattern is that material older than 4.1 b.y. was extensively, but not completely, outgassed around 3.92 b.y.

Cosmogenic isotopes and exposure ages

The cosmic ray exposure age for 15362 was determined to be 428 ± 43 m.y. (Alexander and Kahl 1974).